YUKON RIVER JOINT TECHNICAL COMMITTEE REPORT

YUKON RIVER SALMON RUN OUTLOOKS FOR 2003 AND RECOMMENDED ESCAPEMENT GOALS

Prepared by

THE CANADA/UNITED STATES
YUKON RIVER JOINT TECHNICAL COMMITTEE

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1.0 INTRODUCTION

The 2003 spring meeting of the Canada/U.S. Yukon River Joint Technical Committee (JTC) was held on March 03-05 in Anchorage, Alaska. This report contains specific products of this meeting including: salmon outlooks for the upcoming season; recommended escapement targets for Upper Yukon chinook and chum salmon; a discussion of the management concerns and recommended minimum escapement goals for the Fishing Branch and Sheenjek Rivers within the Porcupine drainage; an update on the strategic JTC research planning exercise; and an update from the *Ichthyophonus* Committee.

Participants at the meeting included:

Executive Secretary, Yukon River Panel
Hugh Monaghan (via teleconference)

Alaska Department of Fish and Game (ADF&G)
John Hilsinger (co-chair)
Judy Berger
Dan Bergstrom
Bonnie Borba
Audra Brase
Fred Bue
Hawachan Hamazaki
Tracy Lingnau
Susan McNeil
Paul Salomone
Lisa Seeb
Christian Smith
Ted Spencer
Charles Swanton
Bill Templin

Association of Village Council Presidents (AVCP)
Ben Greene
David Waltemyer

Bering Sea Fishers Association (BSFA)
Chris Stark

Tanana Chief Conference (TCC)
Kimberly Elkin
Michael Smith

Council of Athabascan Tribal Governments (CATG)
Joe Shlosman

Fisheries and Oceans Canada (DFO)
Sandy Johnston (co-chair)
Terry Beacham
John Candy
Al von Finster
Mary Ellen Jarvis
Patrick Milligan

U.S. Fish and Wildlife Service (USFWS)
Jeff Adams
Jeff Bromaghin
Penny Crane
Ray Hander
Russ Holder
Blair Flannery
Steve Miller
John Wenberg

U.S. National Marine Fisheries Service (NMFS)
John Eiler
Richard Wilmot

U.S. Bureau of Land Management (BLM)
Bob Karlen

U.S. Geological Survey (USGS)
Jim Finn
Chris Zimmerman

Yukon River Drainage Fishermen's Association (YRDFA)
Jill Klein
Michael McDougall
Joe Sullivan

2.0 2003 YUKON RIVER SALMON RUN OUTLOOKS

2.1 ALASKA

2.1.1 Chinook Salmon

Yukon River chinook salmon return primarily as age-5 and age-6 fish, although age-4 and age-7 fish also contribute to the run. Spawning ground escapements in 1997, the brood year producing 6-year-old fish returning in 2003, was the third largest observed in Canada, largest observed in the Tanana River tributaries, and some of the largest in lower Yukon River tributaries. However, the return of salmon since 1998 has been well below average in strength indicating abnormally poor production from parent year escapements. Assuming continued below-average trends in survival rates of parent year escapements, the return of 5- and 6-year-old fish in 2003 is expected to be below average. However, a strong 4-year-old component from 2002 may be an indicator of improved survival rates of parent year escapements.

Overall, the 2003 chinook salmon run is anticipated to be below average to poor in strength. Given the uncertainties associated with recent declines in productivity, the run is anticipated to support an average subsistence harvest and possibly a small commercial harvest. The fishery management is based upon inseason assessments of the actual runs. If inseason qualitative indicators of run strength suggest sufficient abundance exists to have a commercial fishery, the commercial harvest in Alaska could range from 0 to 20,000 chinook salmon (0 to 18,000 fish in the Lower Yukon Area and 0 to 2,000 fish in the Upper Yukon Area). This represents a range of catch well below the previous 30-year period with the exception of the 2000-2003 period.

In January 2001, the Alaska Board of Fisheries (BOF) modified the Yukon River King Salmon Management plan by adding a fishing schedule for the subsistence salmon fisheries. The BOF judged that this subsistence-fishing schedule should provide a reasonable opportunity within each district, subdistrict or area for the subsistence fishery during a normal to below average chinook salmon return. This schedule was enacted to provide for a reasonable opportunity for all subsistence fishers within the Alaskan portion of the Yukon River drainage, while improving the quality of the escapement. The schedule contains periods of subsistence closures to reduce the harvest on any one particular pulse of fish as it migrates to its spawning grounds. In prior years, subsistence fishing for most areas of the Alaska portion of the Yukon River was open seven days per week until the opening of the commercial fishing season.

2.1.2 Summer Chum Salmon

Summer chum salmon spawning escapements in 1998, were slightly above the low end of the recently established Biological Escapement Goal (BEG) ranges in the Anvik and East

Fork Andreafsky Rivers. In 1999, the Anvik River escapement also surpassed the low end of the BEG. However, the escapement into the E.F. Andreafsky was half the low end of its BEG. Apparently recent declines in the productivity of Yukon River summer chum salmon are continuing. This trend is similar to the declines seen in many chinook and chum salmon stocks in the Bering Sea region. Specifically, production of Anvik River chum salmon, which represent the largest spawning stock of Yukon River summer chum salmon, has fallen well below one return per spawner for the most recent returning brood years. Causes for the observed drop in productivity are still largely unknown. Uncertainty exists as to how long this trend will continue, and whether productivity could be reduced even further. While exact reasons for the run failures are unknown, widely speculated is that poor marine survival related to localized weather and ocean conditions in the Bering Sea are the primary contributing factors. Weakness in Yukon River salmon runs has been attributed to reduced productivity, and not the result of low levels of parent year escapements. However, similar to chinook salmon, 4-year-old summer chum salmon were strong and were the largest component of the both the E.F. Andreafsky (83.5%) and Anvik (76.2%) Rivers. The 4-year-old component also dominated both large mesh commercial (55.1%) and subsistence (61.5%) samples.

Overall, the 2003 summer chum salmon run is anticipated to be poor in strength. Given the uncertainties associated with recent declines in productivity, and the beginning of below average parent-year escapements, the run is unlikely to support a commercial harvest. If necessary, subsistence harvest opportunity may also require reductions to provide for escapements. If inseason qualitative indicators of run strength suggest sufficient abundance exists to have a commercial fishery, the commercial harvest in Alaska could range from 0 to 150,000 summer chum salmon.

2.1.3 Fall Chum Salmon

Drainagewide, Yukon River fall chum salmon escapements for the period 1974 through 1998 have been estimated to have ranged from approximately 180,000 (1982) to 1,500,000 (1975), based upon expansion of escapement assessments for selected stocks to approximate overall escapement abundance (Eggers 2001). Escapements in these years resulted in subsequent returns that ranged in size from approximately 315,000 (1996 production) to 1,437,000 (1975 production) fish, using the same approach to approximating overall escapement. Corresponding return per spawner rates range from 0.3 to 3.2, averaging 1.9 for all years combined.

Yukon River fall chum salmon return primarily as age-4 or age-5 fish, although age-3 and age-6 fish also contribute to the run. A Ricker spawner-recruit model was used to predict the returns from the 1997 to 2000 parent years that will contribute to the 2003 run. This process resulted in a projection of 647,000 fall chum salmon with the following approximate age composition:

Brood Year	Escapement	Est'd prod'n (R/S)	Est'd Prod'n	%Contribution based on age	2003 Return
1997	490,782	1.58	777,061	1.3%	8,398
1998	258,666	2.17	560,242	32.7%	211,688
1999	292,851	2.07	605,680	64.5%	417,262
2000	212,376	2.31	489,641	1.6%	9,922
Total run					**647,270**
2003 expected run size (unadjusted for poor survival)					**650,000**
2003 expected run size, adjusted by observed proportion of the expected return for the 1998 to 2002 period (40%)					**260,000**

A level of uncertainty is associated with the 2003 Yukon River fall chum salmon outlook. Very dramatic declines in salmon returns to western Alaska have been realized since 1997 and the trend continued to most areas in 2002. While exact reasons for the region-wide failure are unknown, it has been speculated that it is likely an artifact of poor marine survival resulting from or accentuated by localized conditions in the Bering Sea. Weakness in the salmon runs at the beginning of this downward trend has been attributed to reduced productivity and not completely the result of low levels of parental escapement.

Escapement for each of the four parent years that will contribute to the 2003 run were extremely poor with only 1997 above the minimum drainage-wide escapement goal of 350,000 fall chum salmon. The overall return in 1997 was below the odd-year average run size. The major contributor to the 2003 fall chum salmon run is anticipated to be age-4 fish returning from the parent year 1999. The majority of the escapement goals have not been met since 1998, particularly in the upper Yukon River drainage. Should the factor(s) that affected the productivity of fish from the parent years that returned in 1998 and 1999 carry over to fish expected to return in 2003, a weak return is again likely to materialize.

Beginning in 1999 the projection has been presented as a range that includes the normal point projection as the high end. The low end for 2003 was determined by reducing the normal point projection by the average ratio of observed to predicted returns from 1998 through 2002. During this time period the observed return averaged only 40% of the predicted. The 2003-projected range of return is 260,000 to 650,000 fall chum salmon.

Year	Expected Run Size	Observed Run Size	Observed Proportion of Expected Return
1998	880,000	329,000	.37
1999	1,197,000	424,000	.35
2000	1,137,000	241,000	.21
2001	962,000	383,000	.40
2002	645,606	414,000	.64
Average			**.40**

The potential for another weak return is not unreasonable given there has been speculation that longer-term climatic changes taking place in the North Pacific Ocean and Bering Sea may result in lowering future salmon production. The return of age-4 fish from odd-numbered brood years during the most recent decade typically averages 762,000 chum salmon, and ranges from 243,000 for brood year 1997 to a high of 1,200,000 for brood year 1975. The average run size for odd-numbered years is 1,000,000 chum salmon.

At a projected run size of less than 650,000 fall chum salmon the 2003 run is unlikely to support a commercial harvest. Run assessment will primarily be based on in-season indicators and subsistence harvest opportunities may be reduced to provide for escapement based on the levels stipulated in the Alaska Yukon River Drainage Fall Chum Salmon Management Plan.

2.1.4 Coho Salmon

Although comprehensive escapement information on Yukon River drainage coho salmon is lacking, known is that coho salmon primarily return as age-4 fish and overlap in run timing with fall chum salmon. An average to below average return of coho salmon is anticipated in 2003, based upon parental escapement levels observed in several spawning streams in 1999 and assuming average survival.

The Alaska Yukon River coho salmon management plan allows a directed commercial coho salmon fishery, but only under very unique conditions. Directed coho salmon fishing is dependent on the assessed levels of return for both coho and fall chum salmon since they commonly return mixed together. A directed commercial coho salmon fishery is not likely to occur in 2003 because of the poor outlook for fall chum salmon combined with an average coho salmon return.

2.2 CANADA

2.2.1 Upper Yukon Chinook Salmon

The total run size of Canadian-origin upper Yukon[2] River chinook salmon in 2003 is expected to be approximately 62,000 fish. This forecast is based on an initial stock-recruitment projection of 90,300 fish, reduced by the proportion that the 2002 run fell short of the expected run size:

Year	Expected Run Size	Observed Run Size	Observed Proportion of Expected Return
1998	143,000	69,600	.49
1999	136,000	84,700	.63
2000	128,000	39,500	.31
2001	124,000	78,100	.63
2002	95,000	65,600	.69
Average			**.55**

This approach was used to account for recent declines in the upper Yukon chinook salmon return per spawner. Despite good brood year escapements, runs observed for the 1998-2002 period were relatively low. Available information suggests these low runs are the result of poor marine survival. The upper Yukon chinook run size averaged approximately 81,000 fish during the recent six-year cycle from 1997 to 2002[3]. The 2003 expected run size is therefore expected to be below average.

The interim escapement goal range for rebuilt upper Yukon chinook (excluding the Porcupine) is 33,000 to 43,000 chinook salmon. In recognition that chinook escapements were depressed, the Yukon River Panel developed a rebuilding goal of >28,000[4] for the 1996 through 2002 period, which both Parties have been endeavoring to manage towards. Two of three principal brood years for the 2003 run exceeded the 28,000 rebuilding goal, although only one of the principle brood years exceeded the lower end of interim escapement goal range for rebuilt stocks.

The 2003 run outlook is based on escapement data for 1994 through 1999 and calculated returns per spawner for the individual brood year escapements based on a spawner-recruitment relationship developed for the 1982 to 1994 brood years. Production estimates incorporated age composition data from escapements, and from harvests of

[2] The upper Yukon River, for the purpose of Sections 2.2 and 3.0 of this report, is defined as the Canadian portion of the Yukon River drainage excluding the Porcupine River drainage.

[3] The preliminary estimate of the 2002 run size is 65,600 fish.

[4] The 2001 run outlook was poor and there was a perceived requirement to provide some harvest opportunities to the subsistence fishery in Alaska and the aboriginal fishery in Canada. Based on this information the Yukon River Panel expected that limited fishing opportunities would provide a maintenance harvest and a Canadian spawning population exceeding 18,000 chinook salmon .

Canadian-origin chinook salmon in the U.S. and Canada. Annual returns were reconstructed using ADF&G scale pattern data and Fisheries and Oceans Canada tagging results. Total escapements for 1980-81 and 1984 were estimated by expanding a cumulative five-area escapement index (Tatchun Cr., Big Salmon R., Nisutlin R., Wolf R., and the non-hatchery returns to the Whitehorse Fishway) by the average proportion the index represented of the total escapement estimates. Mark-recapture results were used to estimate the escapement in 1982, 1983 and from 1985 onwards.

The relationship between the natural logarithm of the return per spawner (R/S) and number of spawners (S) for the 1982 to 1994 brood years is described as follows:

Equation [1]: Ln (R/S)=2.895-0.000058(S);

where: S = # spawners (in thousands), R = returns.

The coefficient of determination (r^2) of this regression is 0.47 and the relationship is significant ($p<0.05$).

The 2003 return was estimated by first, calculating the total expected return from each brood year escapement based on equation [1] and then, apportioning it by the average age composition of brood year returns. For example, the escapement of 37,683 chinook in 1997 is expected, under normal survival conditions, to produce 76,153 chinook, all ages combined. However, only age-6 chinook will be returning in 2003 from the 1997 brood year. To calculate the number of age-6 chinook expected from the 1997 brood year, the expected total production of 76,153 was apportioned by the average age composition of brood year returns. Over the 1982-1994 period, the average age composition of brood year returns is as follows: <0.1% age-3, 4.6% age-4, 24.0% age-5, 56.8% age-6, 14.1% age-7, and 0.4% age-8. Therefore, 56.8% of the production from 1997 is expected return as age-6 chinook in 2003, this equals 43,278 fish. The calculations for this and the other brood years are summarized in the table below:

Brood Year	Escapement	Calc'd R/S	Est'd prod'n	Contribution based on age	2003 Return
1995	32,262	2.86	92,150	0.4%	341
1996	28,409	3.60	102,196	14.1%	14,440
1997	37,683	2.02	76,153	56.8%	43,278
1998	16,740	6.78	113,624	24.0%	27,236
1999	11,153	9.59	106,933	4.6%	4,876
2000	12,166	9.05	110,109	0.1%	143
Total					**90,314**
Total, adjusted by observed proportion of the expected return in 2002 (69%)					**62,000**

The point estimate of 90,300 chinook salmon does not incorporate the wide 95% confidence interval range for the Yukon chinook stock recruitment relationship or the recent trend towards decreased marine survival, therefore is considered optimistic. In addition, stock recruitment relationships are usually developed from density dependent relationships developed for a single stock rather than the aggregate of a number of stocks as is used for Yukon River outlooks.

Chinook run outlooks based on stock-recruitment data have been included in Canadian Yukon management plans since 1991. To examine how well this method has performed, annual run outlooks based on stock-recruitment data as described in respective plans since 1991, were compared to actual estimated run sizes. Over the period 1991 to 1999, the mean absolute percent error was 25%. In other words, for this period of time, the annual outlooks were off by an average of 25% (range = 3% to 112%). If the 1998 and 1999 forecasts are ignored, the mean absolute percent error is reduced to about 10%. Run outlooks over-estimated the actual run sizes in four years, and underestimated them in five years. Not surprisingly, the years with the greatest discrepancies included 1998 and 1999 when outlooks overestimated the runs. This pattern of run outlooks overestimating observed returns was also consistent for the 2000, 2001 and 2002 returns. As inferred previously, a significant reduction in marine survival can explain poor performance of the forecasts for the 1998-2002 period.

2.2.2 Upper Yukon Chum Salmon

On average, 65% of upper Yukon adult fall chum salmon return as age-4 and 33% return as age-5. This suggests that the major portion of the 2003 fall chum run should originate from escapements of 46,305 in 1998 and 62,035 in 1999.

For the 1983-2002 period, the average escapement was 68,100 fish; for the 1993 to 2002 period, it was 73,200 fish. The escapement for the principle brood years (1998 and 1999) for the 2003 return fall below both the historic and recent averages. The escapement goal for rebuilt upper Yukon chum salmon is >80,000 fish.

A return rate of 2.5 adults per spawner (R/S) has been used in the joint Canada/U.S. upper Yukon chum salmon rebuilding model for a number of years by Fisheries and Oceans Canada for developing preseason run expectations. This return rate is very close to the estimated 1982 to 1995 long-term average R/S rate of 2.6. The average R/S rate for the 1990-1995 brood years is also estimated to have been 2.6, however the estimated R/S for two recent brood years (1994 and 1995) was only 0.8, a value below that which is required for replacement; a preliminary R/S for brood year 1996 is <0.8.

The relationship between the natural logarithm of the return per spawner (R/S) and number of spawners (S) for the 1982 to 1995 brood years is described as follows:

Equation |1|: Ln (R/S)=1.544-0.000011(S);

where: S = # spawners (in thousands), *R* = returns.

The coefficient of determination (r^2) of this regression is 0.48 and the relationship is significant ($p<0.05$).

Upper Yukon fall chum returns have consistently failed to meet forecasted levels over the recent cycle. The forecast error is as follows:

Year	Expected Run Size	Observed Run Size	Observed Proportion of Expected Return
1998	198,000	61,500	.31
1999	336,000	102,400	.30
2000	334,000	70,100	.21
2001	245,000	45,200	.18
2002	144,000	97,000	.67
Average			**.33**

In 2003, poor marine conditions may again prevail. The 2003 run size expectation was therefore adjusted to reflect the observed proportion of the expected return for 2002 of 67%.

Brood Year	Escapement	Est'd prod'n (R/S)	Contribution based on age	2003 Return
1997	85,439	1.91	1.3%	2,124
1998	46,305	2.88	32.8%	43,806
1999	62,035	2.44	64.8%	97,952
2000	55,362	2.62	1.1%	1,598
Total				**145,480**
Total, adjusted by observed proportion of the expected return in 2002 (67%)				**97,500**

Insufficient stock identification data are available for accurately estimating annual run sizes of upper Yukon chum salmon. However, rough estimates can be made, based on the following assumptions:

1/ 30% of the total U.S. catch of fall chum salmon is composed of Canadian-origin fish;
2/ the U.S. catches of Canadian-origin upper Yukon and Porcupine River fall chum are proportional to the ratio of their respective border escapements; and,
3/ the Porcupine River border escapement consists of the Old Crow aboriginal fishery catch plus the Fishing Branch River escapement.

The recent four-year cycle (1999-2002) return of upper Yukon Canadian-origin chum salmon is 78,700. The 1993 to 2002 average return is 120,500 while the 1983 to 2002 average return is 145,400. In comparison, the 2003 upper Yukon chum salmon expectation of 97,500 fish is below average. However, in 2002 some improvement in the proportion of the return was observed versus the run strength forecasted. In the 4-year period before 2002, the observed chum salmon returns averaged only 25% of preseason projections. In addition, marine conditions in the winter of 2002-2003 appear to be more favourable than they have been in a number years. The 2003 run forecast of 97,500 fish is expected to be below average.

2.2.3 Porcupine River Chum Salmon

The fall chum salmon run to Canadian portions of the Porcupine River drainage in 2003 should originate primarily from the 1998 and 1999 escapements. For these years, the Fishing Branch River weir counts were 13,564 and 12,904 chum salmon respectively. These counts were 2.0% higher and 3.0% lower than the 1998-2002 cycle average of 13,304 fish and they are among the lowest counts recorded. The lowest count of 5,063 was recorded in YR 2000. The interim escapement goal is 50,000 to 120,000 chum salmon.

As with upper Yukon chum salmon, run sizes have consistently failed to meet forecasted levels over the recent cycle. The forecast error is as follows:

Year	Expected Run Size	Observed Run Size	Observed Proportion of Expected Return
1998	112,000	25,200	.23
1999	124,000	23,500	.19
2000	150,000	11,800	.08
2001	101,000	30,500	.30
2002	41,000	16,100	.39
Average			**.24**

Productivity of the Fishing Branch River chum stocks appears to be lower than that of both the drainagewide stock aggregate and the upper Yukon stock aggregate, particularly when averaged over 1988 to 1991 brood years. Return information from 1992 to 1996 brood years has not been finalized. A stock-recruitment brood table prepared using the assumptions listed above suggests that the average R/S for brood years 1982 through 1991 was 2.2. This estimated production level was used to develop a forecast for 2003 that was reduced by the shortfall observed in 2002.

Brood Year	Escapement	Est'd prod'n @ 2.2 (R/S)	Contribution based on age	2003 Return
1998	13,564	29,841	36.0%	10,743
1999	12,094	26,607	60.0%	17,033
Sub-total				27,776
Total (expanded for other age classes)				**28,933**
Total, adjusted by observed proportion of the expected return in 2002 (39%)				**11,300**

Assuming a R/S value of 2.2, and using the average age at maturity for Fishing Branch chum salmon of 60.0% age-4 and 36.0% age-5, a return of 11,300 fish is expected in 2003.

This forecast has been expressed with serious conservation concerns for this stock. There has been improvement in Fishing Branch River escapement from a record low of 5,053 observed in 2000 to 21,556 observed in 2001 to 13,363 observed in 2002. The 2003 outlook, however represents a poor return and it is 77% below the lower level of the 50,000 to 120,000 escapement goal range.

3.0 RECOMMENDED ESCAPEMENT TARGETS FOR UPPER YUKON RIVER CHINOOK AND CHUM SALMON AND PORCUPINE DRAINAGE CHUM SALMON

As per the Yukon River Salmon Agreement, the Yukon River Panel may from time to time recommend spawning escapement objectives for implementation through their management entities. The Panel may also revise spawning escapement objectives for rebuilt stocks. Escapement targets for rebuilt Canadian-origin chinook and mainstem chum salmon stocks are: 33,000 to 43,000 chinook salmon and >80,000 chum salmon. When spawning escapements fall below target levels for rebuilt stocks, upon recommendation of the Yukon River Panel, the Parties shall, through their respective management entities, implement a brood year rebuilding program for the Canadian mainstem stocks. The objective of a rebuilding plan is to systematically rebuild the spawning escapement in subsequent return years to higher levels that meet the escapement objectives.

The rebuilding program shall take into account the relative health of the brood years with the object of rebuilding stronger brood years in one cycle and weaker brood years in no more than three cycles in equal increments. For greater certainty, a cycle for chum salmon is typically considered to be four years, and for chinook salmon, six years, although the Panel may incorporate other age components in designing rebuilding programs.

Based on the recommendations from the JTC, the Yukon River Panel shall establish and modify as necessary interim escapement objectives of the rebuilding program.

3.1 CHINOOK SALMON

For chinook salmon, the 2003 run of upper Yukon chinook salmon will be returning from escapements of 28,409 (1996), 37,683 (1997) and 16,750 (1998), which constitute the principal brood years. The average escapement of these three years is 27,614 and the weighted average is 31,011 (this gives higher weighting to the escapement in 1997, the year that should contribute the greatest to the 2003 run size).

The average long-term annual return (1980-2002) of upper Yukon chinook salmon is 120,000 which would satisfy First Nation and Alaska subsistence fishery needs, provide for commercial harvests, and allow for rebuilding of escapements. However, since 1998, Yukon River chinook salmon returns have been much reduced, averaging only 67,000 fish. The 2003 projection of 62,000 upper Yukon chinook salmon will not satisfy First Nation and Alaska subsistence needs and the rebuilt stock escapement objective of 33,000 to 44,000. One option has been developed by the JTC for Panel consideration when setting the chinook salmon escapement objective for the 2003 season. This suggested option is outlined as follows:

Suggested Option : An escapement target of 25,000 Upper Yukon chinook salmon. This escapement target will be increased to 28,000 in the event that a U.S. commercial fishery is initiated.

An escapement target of 28,000 was originally proposed for the 1996 to 2001 period which, when it was initiated, constituted the first step of a chinook rebuilding plan agreed to in 1995. The second step of the rebuilding plan was intended to commence in 2002 with the objective of using target escapements that would result in an optimum sustained yield being attained in 2007.

The option presented is the same as the target adopted by the Yukon Panel for the 2002 fishing season. A condition of the 2002 target was an increase of the escapement goal from 25,000 to 28,000 in the event that a U.S. commercial fishery was initiated.

Under the proposed scenario, closures in commercial, domestic and recreational fisheries will be required if the run returns as expected.

3.2 UPPER YUKON CHUM SALMON

The long-term (1980-2002) average estimated return of upper Yukon chum salmon is 143,000 which would satisfy First Nation and Alaska subsistence fishery needs, provide for commercial harvests, and allow for the rebuilding of escapements. However, since 1998, returns have been much reduced, averaging only 75,300 fish. Observed returns

have consistently fallen short of the expected run sizes since 1998. The 2003 projection of 97,500 upper Yukon chum salmon will not satisfy First Nation and Alaska subsistence needs and the rebuilt stock escapement objective if the run returns at the projected level.

The 2003 run of upper Yukon chum salmon will be returning from escapements of 46,305 in 1998 and 62,035 in 1999. The weighted average of these two principal brood years is approximately 57,000. A weighted average gives a higher weighting to the 1999 escapement since the majority of the fall chum salmon return run is composed of age-4 fish.

Target escapement options incorporating one, two and three cycle rebuilding scenarios were developed from two base levels. The base levels include the rounded 1999 escapement (62,000) and the weighted average brood escapement (57,000). These options are presented in the following table:

Year	1 cycle rebuild esc. targets		2 cycle rebuild esc. targets		3 cycle rebuild esc. targets	
Base level	**62,000**	**57,000**	**62,000**	**57,000**	**62,000**	**57,000**
2003	**80,000**	**80,000**	**71,000**	**69,000**	**68,000**	**65,000**
2007	**80,000**	**80,000**	**80,000**	**80,000**	**74,000**	**72,000**
2011	**80,000**	**80,000**	**80,000**	**80,000**	**80,000**	**80,000**

The escapement target options for 2003 range from 65,000 to 80,000 fish depending upon which rebuilding scenario and base level is chosen. For example, the 2003 escapement target would be 65,000 chum salmon if the Panel chose a three cycle rebuilding plan to rebuild the weighted escapement of 57,000 to 80,000 by 2011. To rebuild the weighted escapement in two cycles would require an escapement target of 69,000 chum salmon in 2003.

The 2003 run size is expected to be 97,500 chum salmon and it is possible that the total run size will not achieve any of the base escapement levels identified above. Given this prospect, caution is warranted in opening any fishery for fall chum salmon in 2003 and extensive fishery restrictions should be expected.

3.3 PORCUPINE CHUM SALMON

Serious concerns are expressed for the 2003 Porcupine River chum salmon escapement, both for Canadian (Fishing Branch) and U.S. (Sheenjek) stocks. The primary brood year escapement (1999) for Fishing Branch stock was 76% below the lower end of the escapement goal range and the Sheenjek escapement in 1999 was 72% below the lower end of its escapement goal range. The JTC recommends management actions be implemented in 2003 to specifically address conservation of these stocks.

Management plans should be developed to achieve the following minimum spawning escapement goals:

Fishing Branch	>15,000
Sheenjek	>50,000

The JTC acknowledges the target escapement for Fishing Branch chum salmon in 2003 is well below long-term goal. The recommendation for an interim escapement target of >15,000 chum in 2003 reflects the fact the productivity of this stock has fallen to barely more than 1:1 on average over the past two years and has fell below 1:1 before 2001. Although an escapement target of >15,000 constitutes a small step towards rebuilding this stock, this target is considered to be realistic and somewhat optimistic considering recent trends. Extensive management actions were taken in 2002, which should have drastically reduced the harvest of Porcupine stocks and benefited spawning escapements. However, in spite of these actions, the 2002 Fishing Branch and Sheenjek escapements still fell below the number of spawners recorded in 1998, the primary brood year contributing to the 2002 run. Given the run outlooks and the depressed nature of Porcupine drainage chum salmon, to be develop and implement very conservative management strategies are crucial in 2003.

Alaska will continue to manage the fall chum salmon run based on the Alaska Board of Fisheries adopted fall chum salmon management plan. This plan directs ADF&G to manage the fall chum run conservatively to provide for the escapement goals and to address management concerns for specific stocks including Fishing Branch River chum salmon. The Board of Fisheries also established a subsistence fishing schedule beginning in 2001, which reduces the amount of subsistence fishing time in most districts. If the run size projections are below all escapement needs, all fishing is closed. If the projected surplus above escapement needs is small, the subsistence schedule is reduced. In all cases, individual drainages or tributaries may be managed separately, either to allow additional subsistence fishing time if escapement is projected to be met, or to restrict or close subsistence fishing in order to achieve escapement goals. In the case of the Sheenjek and Fishing Branch Rivers, a good relationship appears between fall chum salmon escapements in these two spawning areas. For example, if the Sheenjek River escapement is low, the Fishing Branch escapement is also low. Therefore, the Porcupine River stocks will be managed in Alaska primarily based on the inseason Sheenjek escapement projections.

4.0 STRATEGIC RESEARCH PLANNING OF YUKON RIVER SALMON

Last year the JTC met for two intensive work sessions to develop a plan for Yukon River strategic research. The JTC invited Peggy Merritt to facilitate the planning process. She used the software Expert Choice to aid the group in prioritizing goals, objectives and issues. The committee broke into groups based on interest (escapement, harvest, stewardship, habitat and ecosystem) to prioritize current issues and possible future

projects. A glossary was written to define terms used within the plan. Peggy submitted a report on the plan to the JTC in September 2002.

The JTC discussed the current draft of the plan at our meeting in Whitehorse during the week of 28 October 2002. The work session discussions identified numerous research themes and needs, and were educational for JTC members who have different backgrounds and interests. While the content of the draft plan was valuable and comprehensive, the degree of overlap and repetition within the plan seemed to be contributing to poor prioritization of projects. Attempts to reach consensus smoothed the results and the interest groups did not prioritize plan elements consistently. The JTC formed an ad hoc subcommittee tasked with trying to improve the organization of the plan, while maintaining its original content.

The subcommittee combined two of the original goals, leaving the following four goals: fisheries management, public support and participation, habitat, and salmon biology. Within each goal, objectives and issues were generalized and referenced from the original plan. The new draft was thoroughly discussed line-by-line. The subcommittee completed its work and a new draft plan structure was distributed to all JTC members for review.

The next step is to finalize a plan structure. The final goals, objectives, and issues will need to be re-scored, and individual projects need to be appropriately placed under issues. Criteria by which projects were weighted may need to be redesigned. Alternative procedures for rating plan elements may be developed. A subcommittee was formed to address these needs.

5.0 UPDATE FROM ICHTHYOPHONUS COMMITTEE

The *Ichthyophonus* committee presented an update of their most recent meeting at the March 2003 U.S./Canada JTC meeting. The draft operational plan is currently being finalized and a hiring process has been initiated.

An interest exists in locating researchers who have conducted relevant research concerning *Ichthyophonus* and who have published their results in recognized journals. Tthe committee will submit a "Request for Proposals" advertisement to PISCES and other international organizations to find a pool of researchers with whom we can coordinate research. The committee was also alerted a Western Fish Disease meeting is taking place in July of 2003 in Seattle . Hopefully we can request a "mini" workshop with other scientists with an interest in *Ichthyophonus*, and have a pathologist with a fisheries manager in attendance.

The most important committee discussion concerned a new method of testing for *Ichthyophonus* that may be more sensitive than what is currently being used. An important benefit of this method is the samples can be collected using non-lethal means. This method of testing, called a Polymerase Chain Reaction (PCR), has not yet been

proven for *Ichthyophonus* detection. This test is very sensitive, and involves multiples of a segment of DNA. The disease is systemic, and in its clinical state, infectious bodies should be present in the blood. The PCR test should be capable of detecting these infectious bodies in the blood. The PCR test would have to be compared to the current method of tissue sampling for ground-truthing. The *Ichthyophonus* committee is making PCR investigation a priority, and is currently pursuing a contract to develop a PCR test for *Ichthyophonus* detection. The operational plan would be informational as concerns the PCR test, not a methods description. By 2004 we should know if using blood, and live sampling is possible. Another advantage of PCR test is ts easy be application to juvenile salmon.